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NASA Technology Allows Engineers to See Airframe Noise

Bright, computer images of landing gear wind noise are enabling NASA engineers to pinpoint loud and preventable aircraft flight sounds more easily than in the past, raising the prospect of quieter take-off and landings. In a series of tests conducted at NASA's Ames Research Center the



NASA Ames Photo

Aircraft landing gear undergoing testing.

sounds have been depicted as colored images on a computer screen. These new test data provide critical visual information to aircraft designers concerned about possible enforcement of stricter aircraft noise rules.

"Some airports are imposing nighttime curfews on noisy take-offs and landings, encouraging aircraft manufacturers to make quieter planes," said Paul Soderman, leader of the Ames aeroacoustics group. "If U.S. airplane makers can't meet the new noise rules, those manufacturers may well have difficulty selling their aircraft, both domestically and in foreign markets," he speculated. Engineers anticipate that lower aircraft noise limits also will be issued by the International Civil Aviation Organization, which makes airplane noise rules for much of the non-U.S. aviation community.

"Now that we can easily see the causes of the annoying 'whooshing' wind noises that come from airliner landing gear, we can take steps to analyze and eventually reduce the noise significantly," Soderman said. Airframe parts, including landing gear, flaps and slats, create almost as much noise as the aircraft engines on approach to landing.

"We are pleased to see a lot of detail in the sound pictures. The sound images of the quarter-scale landing gear model

we constructed are the first of their kind generated in the United States at this scale, to the best of our knowledge," Soderman said.

Using an array of 70 microphones inside a wind tunnel wall and linked to a computer, engineers can see the vivid images of landing gear wind sounds that normally occur during aircraft take-off and landings. The microphone array minimizes wind tunnel airflow noise so that landing gear noise sources as small as 6 mm (about a quarter of an inch) can be identified. At full-scale, these sources are 24 mm across, or about an inch, according to engineers who conducted the tests in the Ames 7-by-10-foot wind tunnel that the U.S. Army operates for NASA. Researchers reduced noise significantly as they removed various combinations of landing gear parts from the test model in the wind tunnel.

"A landing gear slows an airplane as it comes in for a landing, and if we reduce the drag too much, the plane would be traveling faster than it should as it approaches the runway," Soderman explained. "Removing pieces, or altering part shapes, is not as easy as it sounds because many of the changes would greatly affect how the landing gear and plane operate."

The results from this test will enable researchers to decide how to create air drag, or friction, to slow the airplane without causing as much noise, he added. "Preliminary data analysis indicates that a faired landing gear generates considerably less noise than an unmodified landing gear and, though full fairings may not be commercially practical, the data represent a probable lower limit of landing gear noise," Soderman said.

Ames conducted the landing gear tests in collaboration with researchers at NASA's Langley Research Center and Boeing Commercial Airplane Co., Seattle, WA, as part of NASA's quiet aircraft technology program.

In June 2001, engineers plan to attach the quarter-scale landing gear model to a model of a quarter-scale commercial transport wing and to conduct more tests. Researchers will measure airframe fly-over noise and surface wing pressures with and without the landing gear extended during simulated landing approaches. Researchers also will evaluate noise control devices.

NASA Astrobiology Architect, Dr. Gerald Soffen, Dies

by A. V. Diaz

Dr. Gerald Soffen, a friend, a leader and a pioneer passed away on Wednesday night, November 22. He served as the Goddard's Director of University Programs and as an advisor to the Administrator.

Gerry left a life-time of contributions, passions and achievements. He had a fire in his heart, soul and mind for science, students and NASA.

Journalists from around the world sought Gerry for his ability to interpret complex and exciting science information, whether about Mars or astrobiology. As a leader he inspired millions of people over the course of his 30-year career. Gerry pioneered scientific investigations as part of the Viking mission and later in Earth sciences. The scientific community will remember him for his forthrightness and willingness to challenge the status quo.

Gerry loved bridging the talents and the potential of young people with NASA's missions. He knew more students, faculty and places to offer than we can count. The NASA Academy is a testimony of Gerry's abiding interest to develop a pipeline from higher education institutions to the labs and research environments across the Agency. He touched many students who will remember him for his kindness and caring approach in pursuit an aerospace career.

Gerry loved NASA. He never recognized a clock or schedule when it came to giving to the organization. He gave of himself every waking moment to Goddard and the spirit of NASA's mission to explore, share and inspire.

We will miss Gerry. We will remember him as a bold pioneer, a delicate listener, enthusiastic communicator, and a friend.

Brian Welch, NASA Director of Media Services, Dies

Brian D. Welch, a veteran public affairs officer for the space agency and NASA's Director of Media Services, died Friday, Nov. 24, after suffering a heart attack. He was 42.

"All of us at NASA are stunned and saddened by this tragic loss," said NASA Administrator Daniel S. Goldin. "Brian's love and enthusiasm for space flight and exploration was infectious. He approached his job with a passion and a purpose and truly embodied the spirit of this agency."

Educational Programs Offered at the Visitor Center

Astronomy, Earth Science, scientific ballooning, careers and more are the subject of programs being offered for school and civic groups December 2000 through February 2001 at the NASA Wallops Flight Facility Visitor Center.

Each program is designed for specific grade levels and incorporates Virginia and Maryland Standards of Learning.

December - Space Science

Sun/Earth Connections (Grade 3 - 6)

Explores the relationship between the Sun and the Earth. Topics include seasons, Earth's orbit and properties of our planet. Sunspots and other features on the Sun also are discussed.

Solar System (Grade 3 - 6)

The nine planets and other elements in our solar system are explored and students work in groups to develop an in-depth planetary study.

Astronomy - Hubble Space Telescope (Grade 3 - 6)

Students use Hubble Deep Field images to collect and interpret scientific data and apply estimation skills.

January - Earth Science & Ballooning Earth from Space (Grade 4 - 8)

Students use images and data from satellites and the Space Shuttle to study different aspects of our planet.

Weather and Climate (Grade 3 - 6)

Using information from satellites students investigate factors that influence our weather. Ocean currents, hurricanes and global cloud cover are some of the topics discussed in this program.

Balloons and Weather Instruments (Grade 5 - 8)

Students participate in hot-air balloon launches and learn about buoyancy and how NASA uses balloons to lift payloads to the fringes of space.

February - Careers, Black History Month and more.

Multi-cultural Astronomy (Grade 3 - 10) Feb. 12 - 16, 2001

This program relates the role of astronomy in the Underground Railroad. Students learn about star constellations and their importance to navigation.

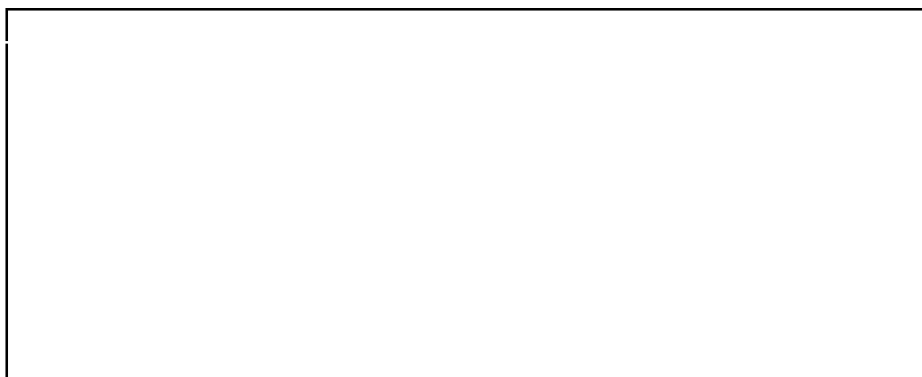
Aeronautics (Grade 4 - 6)

Students work in groups to investigate NASA X-planes and learn aircraft geometry.

Rocketry (Grade 3 - 8)

Fly bottle rockets and explore Newton's Laws of Motion.

The Visitor Center is open from 10 a.m. to 4 p.m. Monday through Friday. It will be closed Christmas and New Year's Day. For further information or to schedule a program call (757) 824-2298.



Brett Vincent, GN&C Engineering Branch, checks equipment during a gondola hang test, Nov. 30. The gondola is scheduled to fly on an Ultra Long Duration Balloon from Alice Springs, Australia in January 2001.

The Cafeteria will be serving soup and sandwiches only the week prior to Christmas, December 18 - 22 and will be closed the week after Christmas, December 26 - 29. Normal operations will resume on Tuesday, January 2, 2001.

Upcoming Events

The Wallops Christmas Party will be held on Dec. 15 in Bldg. F-3 immediately following the Annual Awards Ceremony.

The event is sponsored by the Wallops Exchange and Morale Association (WEMA), Morale Activities Committee and will be catered by W.W. Catering & Jonithan Stone. Beginning at 6 p.m., music will be provided by The Zydecats. Wallops civil service and contractors and their spouses are invited.

Join us:

In January for a Super Bowl Party with a "Best Chili" contest and cash awards given to the winners.

In February for a Daytona 500 Party.

How to Have a Healthy Holiday

The Employee Assistance Program will host the next discussion group on Dec. 7 at 11:30 a.m. The topic will be "How to have a Healthy Holiday."

Join us to talk about past experiences and share tips to cope with holiday pressures. The group will meet in Building F160, Room C164. For further information call the EAP on x66-4600.

Hunting on Wallops Island

Senior management of the Goddard Space Flight Center has recently considered several issues relative to providing a safer working environment for employees and assuring compliance with federal and agency firearm policies. This has resulted in certain restrictions on the use of Wallops Island for recreational purposes.

Hunting on Wallops Island will be allowed only on Saturdays and on certain holidays during the legal hunting season. The island will be closed to other recreational uses of the island on those days. For the 2000 hunting season, the designated hunting days in December are: Dec. 2, 9, 16, 23, 25, and 30 and in January are: Jan. 1, 6, 13, 15, and 20, 2001.

Additional safety rules for hunting are still being formulated. Interim rules will be briefed when hunting passes are obtained from the WEMA Hunt Club. Only waterfowl hunting will be allowed initially, though it is expected that deer hunting will be allowed soon.

Contact Steve Skees, x1097 or John Hickman, x2374 to obtain a pass. Sundays and weekday hours before and after normal working hours are reserved for non-hunting recreational uses.

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